

## Low Phase Noise XO (24MHz to 50MHz)

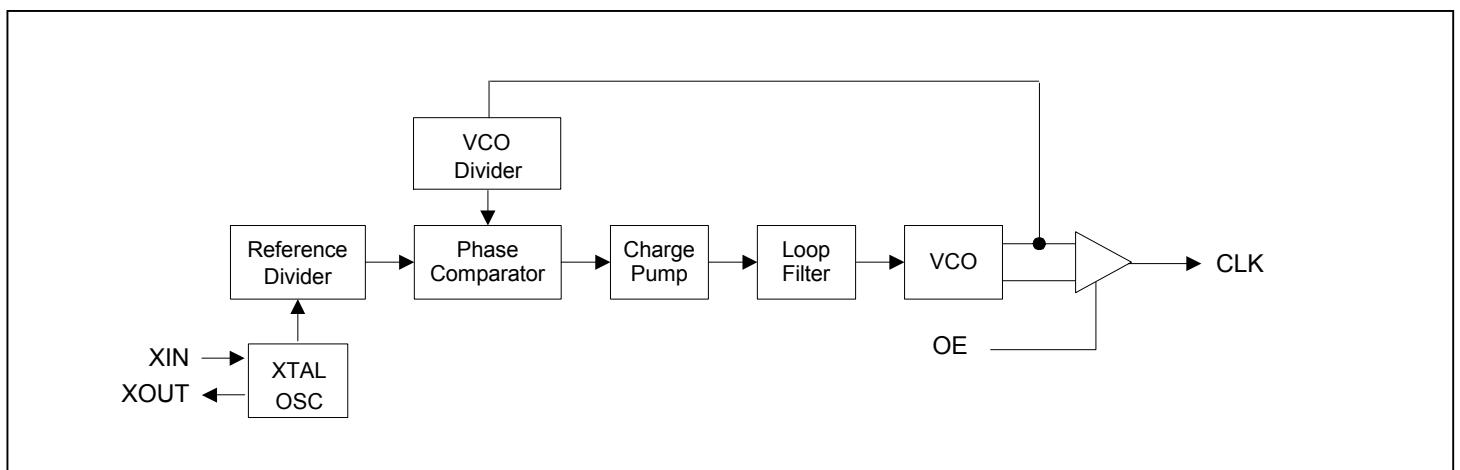
### FEATURES

- Low phase noise XO output for the 24MHz to 50MHz range (-135 dBc at 10kHz offset).
- 12 to 25MHz crystal input.
- Integrated crystal load capacitor: no external load capacitor required.
- Low jitter (RMS): 3ps period jitter (1 sigma).
- Selectable High Drive (30mA) or Standard Drive (10mA) output.
- 3.3V operation.
- Available in 8-Pin TSSOP or SOIC.

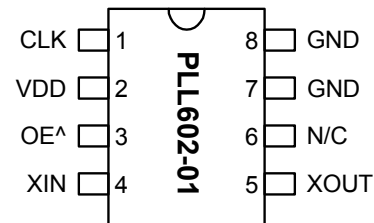
### DESCRIPTION

The PLL602-01 is a low cost, high performance and low phase noise XO, providing less than -135dBc at 10kHz offset in the 24MHz to 50MHz operating range. The very low jitter (3ps RMS period jitter) makes this chip ideal for applications requiring clean reference frequency sources. Input crystal can range from 12 to 25MHz (fundamental resonant mode).

### BLOCK DIAGRAM



### PIN CONFIGURATION



^: Denotes internal pull-up

### OUTPUT RANGE

| MULTIPLIER | FREQUENCY RANGE | OUTPUT BUFFER |
|------------|-----------------|---------------|
| x2         | 24 - 50MHz      | CMOS          |

## Low Phase Noise XO (24MHz to 50MHz)

### PIN DESCRIPTIONS

| Name | Number | Type | Description                                                                                                                           |
|------|--------|------|---------------------------------------------------------------------------------------------------------------------------------------|
| CLK  | 1      | O    | Output clock.                                                                                                                         |
| VDD  | 2      | P    | +3.3V power supply.                                                                                                                   |
| OE   | 3      | I    | Output enable input. Disables (tri-state) output when low. Internal pull-up enables output by default if pin is not connected to low. |
| XIN  | 4      | I    | Crystal input. See Crystal Specifications on page 3.                                                                                  |
| XOUT | 5      | I    | Crystal output. See Crystal Specifications on page 3.                                                                                 |
| N/C  | 6      | -    | Not connected.                                                                                                                        |
| GND  | 7, 8   | P    | Ground.                                                                                                                               |

### ELECTRICAL SPECIFICATIONS

#### 1. Absolute Maximum Ratings

| PARAMETERS                        | SYMBOL   | MIN. | MAX.         | UNITS |
|-----------------------------------|----------|------|--------------|-------|
| Supply Voltage                    | $V_{DD}$ |      | 4.6          | V     |
| Input Voltage, dc                 | $V_I$    | -0.5 | $V_{DD}+0.5$ | V     |
| Output Voltage, dc                | $V_O$    | -0.5 | $V_{DD}+0.5$ | V     |
| Storage Temperature               | $T_S$    | -65  | 150          | °C    |
| Ambient Operating Temperature*    | $T_A$    | -40  | 85           | °C    |
| Junction Temperature              | $T_J$    |      | 125          | °C    |
| Lead Temperature (soldering, 10s) |          |      | 260          | °C    |
| ESD Protection, Human Body Model  |          |      | 2            | kV    |

Exposure of the device under conditions beyond the limits specified by Maximum Ratings for extended periods may cause permanent damage to the device and affect product reliability. These conditions represent a stress rating only, and functional operations of the device at these or any other conditions above the operational limits noted in this specification is not implied.

\* **Note:** Operating Temperature is guaranteed by design for all parts (COMMERCIAL and INDUSTRIAL), but tested for COMMERCIAL grade only.

#### 2. DC Electrical Specifications

| PARAMETERS                                   | SYMBOL   | CONDITIONS                                           | MIN. | TYP. | MAX. | UNITS |
|----------------------------------------------|----------|------------------------------------------------------|------|------|------|-------|
| Supply Current, Dynamic, with Loaded Outputs | $I_{DD}$ | $F_{XIN} = 12 - 25\text{MHz}$<br>Output load of 10pF |      | 16   | 20   | mA    |
| Operating Voltage                            | $V_{DD}$ |                                                      | 2.97 |      | 3.63 | V     |
| Output drive current (High Drive)            | $I_{OH}$ | $V_{OH} = V_{DD}-0.4\text{V}$ , $V_{DD}=3.3\text{V}$ | 30   |      |      | mA    |
|                                              | $I_{OL}$ | $V_{OL} = 0.4\text{V}$ , $V_{DD} = 3.3\text{V}$      | 30   |      |      | mA    |
| Output drive current (Standard Drive)        | $I_{OH}$ | $V_{OH} = V_{DD}-0.4\text{V}$ , $V_{DD}=3.3\text{V}$ | 10   |      |      | mA    |
|                                              | $I_{OL}$ | $V_{OL} = 0.4\text{V}$ , $V_{DD} = 3.3\text{V}$      | 10   |      |      | mA    |
| Short Circuit Current                        |          |                                                      |      | ±50  |      | mA    |

## Low Phase Noise XO (24MHz to 50MHz)

### 3. AC Specification

| PARAMETERS                                   | SYMBOL | CONDITIONS                     | MIN. | TYP. | MAX. | UNITS |
|----------------------------------------------|--------|--------------------------------|------|------|------|-------|
| Input Crystal Frequency                      |        |                                | 12   |      | 25   | MHz   |
| Output Clock Rise/Fall Time (Standard Drive) |        | 0.3V ~ 3.0V with 15 pF load    |      | 2.4  |      | ns    |
| Output Clock Rise/Fall Time (High Drive)     |        | 0.3V ~ 3.0V with 15 pF load    |      | 1.2  |      |       |
| Output Clock Duty Cycle                      |        | Measured @ 50% V <sub>DD</sub> | 45   | 50   | 55   | %     |

### 4. Jitter and Phase Noise Specification

| PARAMETERS                                 | CONDITIONS                                                            | MIN. | TYP. | MAX. | UNITS  |
|--------------------------------------------|-----------------------------------------------------------------------|------|------|------|--------|
| RMS Period Jitter (1 sigma – 1000 samples) | at 44MHz, with capacitive decoupling between V <sub>DD</sub> and GND. |      | 3    |      | ps     |
| Phase Noise relative to carrier            | 44MHz @100Hz offset                                                   |      | -80  |      | dBc/Hz |
| Phase Noise relative to carrier            | 44MHz @1kHz offset                                                    |      | -110 |      | dBc/Hz |
| Phase Noise relative to carrier            | 44MHz @10kHz offset                                                   |      | -135 |      | dBc/Hz |
| Phase Noise relative to carrier            | 44MHz @100kHz offset                                                  |      | -130 |      | dBc/Hz |
| Phase Noise relative to carrier            | 44MHz @1MHz offset                                                    |      | -132 |      | dBc/Hz |

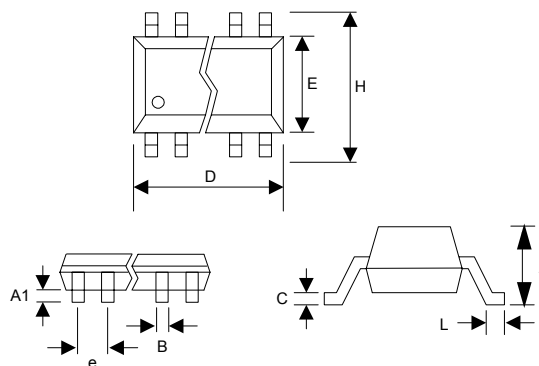
### 5. Crystal Specifications

| PARAMETERS                         | SYMBOL                | MIN. | TYP. | MAX. | UNITS |
|------------------------------------|-----------------------|------|------|------|-------|
| Crystal Resonator Frequency        | F <sub>XIN</sub>      | 12   |      | 25   | MHz   |
| Crystal Loading Capacitance Rating | C <sub>L</sub> (xtal) |      | 20   |      | pF    |
| Driving power                      |                       |      | 1    |      | mW    |
| ESR                                | R <sub>s</sub>        |      |      | 30   | Ω     |

## PACKAGE INFORMATION

8 PIN ( dimensions in mm )

|        | Narrow SOIC |      | TSSOP    |      |
|--------|-------------|------|----------|------|
| Symbol | Min.        | Max. | Min.     | Max. |
| A      | 1.47        | 1.73 | -        | 1.20 |
| A1     | 0.10        | 0.25 | 0.05     | 0.15 |
| B      | 0.33        | 0.51 | 0.19     | 0.30 |
| C      | 0.19        | 0.25 | 0.09     | 0.20 |
| D      | 4.80        | 4.95 | 2.90     | 3.10 |
| E      | 3.80        | 4.00 | 4.30     | 4.50 |
| H      | 5.80        | 6.20 | 6.20     | 6.60 |
| L      | 0.38        | 1.27 | 0.45     | 0.75 |
| e      | 1.27 BSC    |      | 0.65 BSC |      |



**Low Phase Noise XO (24MHz to 50MHz)**

**ORDERING INFORMATION**

**For part ordering, please contact our Sales Department:**

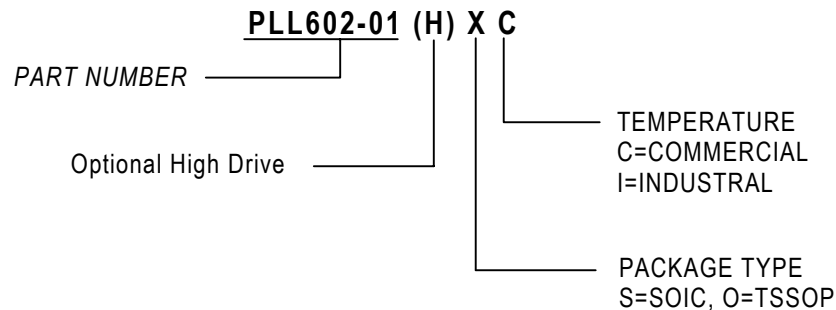
47745 Fremont Blvd., Fremont, CA 94538, USA

Tel: (510) 492-0990 Fax: (510) 492-0991

**PART NUMBER**

The order number for this device is a combination of the following:

Device number, Package type and Operating temperature range



| <u>Order Number</u> | <u>Marking</u> | <u>Package Option</u> |
|---------------------|----------------|-----------------------|
| PLL602-01OC-R       | P602-01OC      | TSSOP - Tape and Reel |
| PLL602-01OC         | P602-01OC      | TSSOP - Tube          |
| PLL602-01HOC-R      | P602-01HOC     | TSSOP - Tape and Reel |
| PLL602-01HOC        | P602-01HOC     | TSSOP - Tube          |
| PLL602-01SC-R       | P602-01SC      | SOIC – Tape and Reel  |
| PLL602-01SC         | P602-01SC      | SOIC – Tube           |
| PLL602-01HSC-R      | P602-01HSC     | SOIC – Tape and Reel  |
| PLL602-01HSC        | P602-01HSC     | SOIC – Tube           |

*PhaseLink Corporation, reserves the right to make changes in its products or specifications, or both at any time without notice. The information furnished by Phaselink is believed to be accurate and reliable. However, PhaseLink makes no guarantee or warranty concerning the accuracy of said information and shall not be responsible for any loss or damage of whatever nature resulting from the use of, or reliance upon this product.*

**LIFE SUPPORT POLICY:** PhaseLink's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President of PhaseLink Corporation.